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REPORT ON
IRON DEPOSITS AT HARRIET HARBOUR, MORESBY ISLAND
QUEEN CHARLOTTE ISLAND GROUP

Numerous occurrences of iron ore in the form of magnetite are found on claims controlled by Silver Standard Mines Limited of Vancouver in the vicinity of Harriet Harbour on Moresby Island of the Queen Charlotte Group. The existence of many of these deposits has been known for over fifty years. Prior to World War I there was much prospecting in the area for copper. In those days there was no market for iron ore, and consequently prospectors did very little work to determine the extent of the iron ore showings. Today the situation has changed since there is a good market for iron ore, and deposits, which formerly were worthless, now assume considerable importance.

The writer first visited the area in 1929 to examine copper prospects, and in the course of doing so saw many iron showings. It was apparent then that the tonnage possibilities of these iron deposits had never been investigated. Subsequent examinations in the same area in later years confirmed this view.

Certain conditions must prevail before a mining company can embark in the field of iron ore mining with any hope of success. These conditions are:

- (1) There must be an assured market.
- (2) There must be sufficient tonnage proved to enable the capital expenditure to be returned together with the required profit for a mining venture.
- (3) Low operating costs must be assured.
- (4) Not essential but desirable is to have ore bodies on Crown Granted mineral claims.

The purpose of this report is to analyze the Silver Standard properties in the light of these requirements.

MARKET

The market today for British Columbia iron ore is the Japanese steel industry, which has expanded steadily since World War II. The long term view that this market will continue is considered very hopeful by Japanese authorities.

Japan cannot supply all her own iron ore requirements and must import. The nearest major source of supply is Manchuria, but for obvious reasons Japan has no intention of depending on China for this vital raw material. Her self sufficiency in respect to iron ore is less than thirty percent, and this figure is decreasing year by year. India, British Columbia, Malaya, the Philippines, and to some extent China, are all currently suppliers of ore and will no doubt continue to be so. British Columbia iron ore, provided it is located on the coast, can compete in the Japanese market.

If it is decided to bring an iron property into production in this Province, then a contract can be arranged with Japanese firms, in which tonnage, price, impurities, etc. are all specified.

The current price for iron concentrates f.o.b. ship's hold in British Columbia waters is \$8.05 per long ton assaying 58% iron.

TONNAGE

Ore reserves to provide at least one and a half million long tons of 60% iron concentrates must be found before any thought can be given to production. This would ensure a revenue of 12 million dollars at the current price of concentrates.

Within a radius of four miles from Harriet Harbour some twenty four magnetite deposits are known to occur. In view of the extent of the forest growth and overburden, it is highly probably that numerous others remain to be found. Many of these occurrences lie on claims which have either been optioned or staked by Silver Standard Mines Ltd. Others lie on claims controlled by Frobisher Limited. It is not any one deposit but rather the entire area which may be looked upon to provide the tonnage of iron concentrates necessary to make a profitable operation.

The initial exploration carried out by Silver Standard Mines Ltd. has yielded very encouraging results. During 1958 geophysical surveys by J. M. Black of Vancouver on Crown Granted claims, bordering on Harriet Harbour and under option to the company, have indicated potential tonnages of 500,000 tons and 250,000 tons respectively on two different magnetite zones known as the Magnet and the Dingo. Many years ago the Geological Survey of Canada in Volume I, "Iron Ores of Canada" suggested that the Magnet deposit might contain 175,000 tons on the basis of the known outcrop. The recent geophysical survey has indicated an extended ore body. The average of 34 samples taken systematically across the surface of this deposit by Silver Standard engineers is 54.2% iron for an average width of 35 feet. In respect to the Dingo showing, insufficient surface work has been done to permit sampling.

On the eastern side of Harriet Harbour and one and a half miles distant from the Magnet ore body, Silver Standard has an option on the Jessie claim (Lot 1861) on which magnetite occurrences of exceptional purity are found and on which practically no work has ever been done. The statement is made on page 42 of Volume I, "Iron Ores of Canada" that it is possible that several hundred thousand tons of ore might be present on this claim.

Fifteen claims have been staked in 1959 by Silver Standard covering an area which lies one and a half miles south east of Harriet Harbour and on which several magnetite occurrences have been exposed by small creeks. The writer has seen these ore showings. As rock exposures are so infrequent, it is impossible to size up the tonnage potential. This is potential ground and should be covered by a geophysical survey to determine the extent of the ore bodies.

The Adonis claim, a reverted Crown Grant near Ikeda Bay and within a mile of the Jessie claim, has been acquired by Silver Standard. The description in Volume I, "Iron Ores of Canada" of this claim shows one small magnetite ore body 175 feet long by 5 feet wide. As this is an iron ore body, no work was done on it in the early days.

Magnetite ore bodies are known to occur on several claims, which formerly comprised the Ikeda Mine and from which an appreciable production of copper-gold ore was made over forty years ago. These claims are today owned by Frobisher Limited. They are located within two miles of Harriet Harbour and only one mile from the Jessie ore body. The iron ore potential on these Frobisher claims is unknown, but in view of the many showings, it could be large. While no deal has been made between Frobisher Limited and Silver Standard Mines Limited, it is logical that any ore on the Frobisher claims should be treated at any concentrator, which may be built in the future at Harriet Harbour.

OPERATING COSTS

The deposits, which have been described, are ideally situated to permit year-round cheap operation. None of them is more than two miles from the head of Harriet Harbour, which is shown on the attached map of the southern half of Moresby Island. A concentrating mill would be built on the shore line of the harbour, and ore would be trucked to it from the various deposits. The haulage distances would vary, some of the deposits, like that on the Jessie claim, being less than a mile from the harbour.

Is Harriet Harbour suitable for large-size ore carriers? This is not definitely known, but the C.N.R. coastal boats used to enter the harbour without any difficulty. Judging from the sloping shore line at water's edge, it would appear that there would be ample water for large ships. At any rate this matter could soon be determined.

OPERATING COSTS (continued).

A profitable iron mining industry of this nature must be based on open pit mining, which method ensures very low mining costs. While complete information on the size and shape of the various ore bodies will not be known until they are diamond drilled, it is now evident that the large ore bodies, the Magnet and the Jessie, can be mined by open pit, which should result in ore from these sources being delivered to the mill for around \$1.50 per ton.

As the ore is likely to contain a small percentage of both copper and iron sulphides, the mill should embody both grinding and flotation units in addition to magnetic separation equipment, and should be so designed that, if only magnetic separation is required, grinding and flotation can be eliminated. There is no reason why a milling cost should not be comparable to that at the successful iron ore operation on Texada Island.

Ample fresh water is available for milling. It will be necessary to use diesel power, but with the purchase of fuel oil in bulk from tankers, power costs should be reasonable.

Summing up, if sufficient tonnage can be found to operate on a scale of 1000 tons daily, then low operating costs can be expected at this ideal location.

CROWN GRANTED MINERAL CLAIMS

It is a great advantage to have iron ore on Crown Granted claims, since such ore is not subject to any restrictive legislation by the Provincial Government. The Magnet and Dingo ore bodies are both on Crown Granted claims. It is understood that the ore on the Jessie claim, which formerly was a Crown Granted claim, will receive the same consideration. All the claims owned by Frobisher are Crown Granted. Thus the majority of the known iron occurrences, and happily the most important ones, can be mined and the ore exported without interference.

ORE GRADE

It is expected that the average iron content of ore delivered to a concentrator would approximate that of the other B.C. iron ore operations, namely between 30 and 40 percent iron. The information available on these Harriet Harbour deposits is too incomplete to give any definite grade. It is true that sampling on the surface of the Magnet deposit gave an average of 54.2% iron, and that the Jessie deposit shows remarkably pure ore on the surface, but nevertheless the dilution factor must be considered, and it would be wise not to assume that the average grade would be higher than the other similar-type operations in the Province.

REVIEW OF IRON MINING IN BRITISH COLUMBIA.

In recent years there have been three iron ore mining operations on the coast of British Columbia, all based on selling their output to Japan. In all cases the ore occurrences are of a similar type, namely irregular shaped magnetite ore bodies which have been mined on a scale in excess of 1000 tons daily by open pit operation. Deposits of the same type occur at Harriet Harbour, and therefore it would be well to review the financial results of these past operations as a guide to what might be expected from an operation having the same general characteristics.

Only one of these three operations can be considered a financial success, and the reason for this is that sufficient ore has been found to ensure profits large enough to return the capital expenditure, and in addition yield a good reward to the risk capital. This operation is still going strong.

In the second operation it is understood that the capital expenditure was almost all recovered and then the ore supply became exhausted. There was no reward to the venture capital.

The third operation was illconceived from the start. Sound mining practice was not followed, inasmuch as production was based on an inadequate ore supply. On top of that, the capital expenditure greatly exceeded the estimate. The final result is sure to be a very heavy loss to the venture capital.

The experience of iron mining in the Province thus shows that an operation can be successful if sound judgement is used. The real risk is the initial small expenditure, small in relation to the ultimate capital expenditure, and which is used to prove up the necessary ore reserves. This initial expenditure is entitled to and gets the large reward, should the operation be a success.

CONCLUSION.

In view of the favourable results obtained to date by Silver Standard Mines Limited at Harriet Harbour, there is every justification for an expanded exploration programme to diamond drill the numerous iron ore showings located on claims which they either own or have under option.

If such a programme should continue to be successful, and should prove up a minimum reserve of ore which would yield $1\frac{1}{2}$ million tons of 60% iron concentrates, then as the result of the excellent transportation facilities and the assurance of low operating costs, a profitable mining operation should ensue. For this reason I recommend the expenditure of \$150,000.00 on exploration

with priority being given to test the Magnet, Dingo and Jessie ore zones.

Finally, one must not overlook the success which has attended the exploration results of Frobisher Limited on iron ore deposits at Tasu Harbour on the west coast of Moresby Island, and some sixty miles north west of Harriet Harbour. There iron ore reserves have been indicated by diamond drilling which will yield 5 million tons of 60% iron concentrates. This statement has been made by the president of Frobisher Limited and has appeared in the press. Volume I, "Iron Ores of Canada", issued in 1926, mentions these Tasu Harbour deposits, but did not consider them to be iron ore due to their sulphur content. Today this is no great handicap as it can be removed. While there is no assurance that the Harriet Harbour deposits will respond as favourably to continued exploration, yet the Tasu results have shown what these magnetite deposits are capable of yielding if enough courage is taken to explore them.

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Area in which magnetite deposits occur.

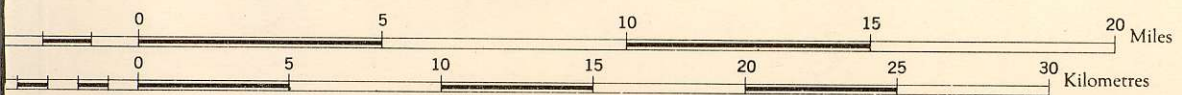
Harriet Harbour

JEDWAY

MORESBY ISLAND

BRITISH COLUMBIA

Scale 1:250,000



20 30 40 50 15' 131°00'